W91321-04-C-0023

LOGANEnergy Corp.

# US Army Schofield Barracks, HI PEM Demonstration Project
# Mid Term Project Report

Proton Exchange Membrane (PEM) Fuel Cell Demonstration
Of Domestically Produced PEM Fuel Cells in Military Facilities

US Army Corps of Engineers
Engineer Research and Development Center
Construction Engineering Research Laboratory
Broad Agency Announcement CERL-BAA-FY03

US Army Schofield Barracks Fire Station

June 3, 2005

## Executive Summary


Under terms of its FY'03 DOD PEM Demonstration Contract with ERDC/CERL, LOGANEnergy installed and currently maintains a 5kWe Plug Power GenSys5P PEM fuel cell power plant at US Army Schofield Barracks, HI fire station. This site was selected during a base tour with Schofield Barracks representatives during a visit on September 8, 2004.

The installation combines both grid parallel/grid independent electrical configurations to support the power requirements of the fire station. The unit is also thermally integrated with the fire station's hot water heater in order to transfer fuel cell process heat to the fire station's hot water tank.

Hawaii Electric serves Schofield Barracks with at a rate of $0.13/kWH. The Gas Company is the LPG provider for the project, supplying project fuel at $1.00 per gallon. It is anticipated that the project will add an additional $1,042 energy costs to the base during the period of performance.

Schofield representatives have proved to be very enthusiastic and supportive of this project since its inception. The project first start occurred on Dec 8, 2004, and was officially commissioned on that same date.

The site acceptance test occurred on May 13, 2005 and was attended by Schofield representatives and visitors from The Gas Company. The unit performed normally during the test and the site inspection confirmed the installation followed the project plan.

The base POC for this project is Keith Yamanaka whose coordinates are:
Email: YamanakK@schofield.army.mil
Telephone: (808) 656-1410 ext.1120

## Table of Contents

**Proposal – Proton Exchange Membrane (PEM) Fuel Cell Demonstration of Domestically Produced Residential PEM Fuel Cells in Military Facilities**

1.0 Descriptive Title

LOGANEnergy Corp. Small Scale PEM 2003 Demonstration Project at US Army Schofield Barracks, Hawaii.

2.0 Name, Address and Related Company Information

LOGANEnergy Corporation

1080 Holcomb Bridge Road
BLDG 100- 175
Roswell, GA 30076
(770) 650- 6388

DUNS 01-562-6211
CAGE Code 09QC3
TIN 58-2292769

LOGANEnergy Corporation is a private Fuel Cell Energy Services company founded in 1994. LOGAN specializes in planning, developing, and maintaining fuel cell projects. In addition, the company works closely with manufacturers to implement their product commercialization strategies. Over the past decade, LOGAN has analyzed hundreds of fuel cell applications. The company has acquired technical skills and expertise by designing, installing and operating over 60 commercial and small-scale fuel cell projects aggregating over 7 megawatts of capacity. These services have been provided to the Department of Defense, fuel cell manufacturers, utilities, and other commercial customers. Presently, LOGAN supports 30 PAFC and PEM fuel cell projects at 21 locations in 15 states, and has agreements to install 22 new projects in the US, Iceland and the UK over the next 12 months.

3.0 Production Capability of the Manufacturer

Plug Power manufactures a line of PEM fuel cell products at its production facility in Latham, NY. The facility produces three lines of PEM products including the 5kW GenSys5C natural gas unit, the GenSys5P LP Gas unit, and the GenCor 5kW standby power system. The current facility has the capability of manufacturing 10,000 units annually. Plug will support this project by providing remote monitoring, telephonic field support, overnight parts supply, and customer support. These services are intended to enhance the reliability and performance of the unit and achieve the highest possible customer satisfaction. Scott Wilshire is the Plug Power point of contact for this project. His phone number is 518.782.7700 ex1338, and his email address is scott_wilshire@plugpower.com.

4.0 Principal Investigator(s)

| | | |
|---|---|---|
| Name | Samuel Logan, Jr. | Keith Spitznagel |
| Title | President | Vice President Market Engagement |
| Company | Logan Energy Corp. | Logan Energy Corp. |
| Phone | 770.650.6388 x 101 | 860.210.8050 |
| Fax | 770.650.7317 | 770.650.7317 |
| Email | samlogan@loganenergy.com | kspitznagel@loganenergy.com |

5.0 Authorized Negotiator(s)

| | | |
|---|---|---|
| Name | Samuel Logan, Jr. | Chris Davis |
| Title | President | Vice President Operations |
| Company | Logan Energy Corp. | Logan Energy Corp. |
| Phone | 770.650.6388 x 101 | 770.650.6388 x102 |
| Fax | 770.650.7317 | 770.650.7317 |
| Email | samlogan@loganenergy.com | cdavis@loganenergy.com |

| | |
|---|---|
| Name | Keith Spitznagel |
| Title | Vice President Market Engagement |
| Company | Logan Energy Corp. |
| Phone | 724.449.4668 |
| Fax | 770.650.7317 |
| Email | kspitznagel@loganenergy.com |

6.0 Past Relevant Performance Information

a) Contract: PC25 Fuel Cell Service and Maintenance Contract #X1237022

Merck & Company
Ms. Stephanie Chapman
Merck & Company
Bldg 53 Northside
Linden Ave. Gate
Linden, NJ 07036
(732) 594-1686

Contract: Four-year PC25 PM Services Maintenance Agreement.
In November 2002 Merck & Company issued a four-year contract to LOGAN to provide fuel cell service, maintenance and operational support for one PC25C fuel cell installed at their Rahway, NJ plant. During the contract period the power plant has operated at 94% availability.

b) Contract: Plug Power Service and Maintenance Agreement to support one 5kWe GenSys 5C and one 5kWe GenSys 5P PEM power plant at NAS Patuxant River, MD. .

Plug Power
Mr. Brian Davenport
968 Albany Shaker Rd.
Latham, NY 12110
(518) 782-7700

LOGAN performed the start-up of both units after Southern Maryland Electric Cooperative completed most of the installation work and continues to provide service and maintenance during the period of performance.

c) Contract: A Partners LLC Commercial Fuel Cell Project Design, Installation and 5-year service and maintenance agreement.
Contract # A Partners LLC, 12/31/01

Mr. Ron Allison
A Partner LLC
1171 Fulton Mall
Fresno, CA 93721
(559) 233-3262

On April 20, 2004 LOGAN completed the installation of a 600kWe PC25C CHP fuel cell installation in Fresno, CA. The fuel cells also provide low-grade waste heat at 140 degrees F that furnishes thermal energy to 98 water source heat pumps located throughout the 12-story building during the winter months.

## 7.0 Host Facility Information

**Picture of US Army Schofield Barracks under attack Dec 7, 1941**.

In 1872, Major General John M. Schofield, Commanding General of the US Army's Pacific Division, visited the Hawaiian Islands to determine the defense capabilities of its ports. He concluded that a harbor could be formed at the mouth of the Pearl River and that it could be easily defended. After the 1898 annexation of Hawaii by the United States, military forces started moving to the islands. In April 1909, the War Department renamed the post to Schofield Barracks from the name most often used in the area, "Castner Village".

The Secretary of War approved plans for construction and troop build-up at Schofield Barracks in 1911. The plans called for five infantry regiments, and one each of cavalry and field artillery. Those plans were later altered but permanent quarters were needed for the four regiments already on post. The first permanent structures on post, which still exist today, were the quadrangle barracks.

When all of Schofield's troops were called to war in 1917 the Hawaiian National Guard moved in and after the Armistice was signed in November 1918 they began beautifying the post. The National Guard planted many of the large trees seen on Schofield

Barracks, including the Norfolk Pines. Construction that was postponed during the war was resumed in the early 1920’s. An extension of the Oahu Railway and Land Company railroad was built to pass in front of the quads.

Construction in the 1930’s reflected a style called art decor, characterized by its round edges. Also in the 1930’s, many of Schofield’s fields and streets were named to commemorate outstanding military leaders including Generals Henry Butner and Harry Bishop, Colonels Wright Smith and George Stoneman and Lieutenants William Sills and Guy Benson.

Up until and during the Korean War, Schofield Barracks facilities were under utilized while mainland facilities were overrun with draftees. In 1951, a basic training center was established for replacement troops. The 25th Infantry returned to Hawaii in 1954 to add to the population of Schofield Barracks. The additional troops and families presented a demand for more facilities to include a new commissary, noncommissioned officers’ club and the first elementary school.

During the Vietnam Conflict, the barracks were so under utilized that they were remodeled to form semi-private rooms. In the 1970’s, upgrades of facilities could be seen all over Schofield Barracks to include commissary, youth and child-care, and restaurant facilities. The post stockade was closed in 1977 and was used as a Correctional Custody Facility until November 1990. H-2, the highway connecting Schofield Barracks to Honolulu, was also completed in 1977.

By the early 1980’s, Schofield Barracks was well populated and the largest post operated by the US Army outside the continental United States. Today, Schofield Barracks is a well-maintained and self-contained Army community. The electric service provider is Hawaii Electric and the LPGas Service provider is Hawaii Gas. The map pictured at right, Figure 1, indicates the location of Schofield Barracks relative to other geographic areas and points of interest on the island of Oahu, HI.

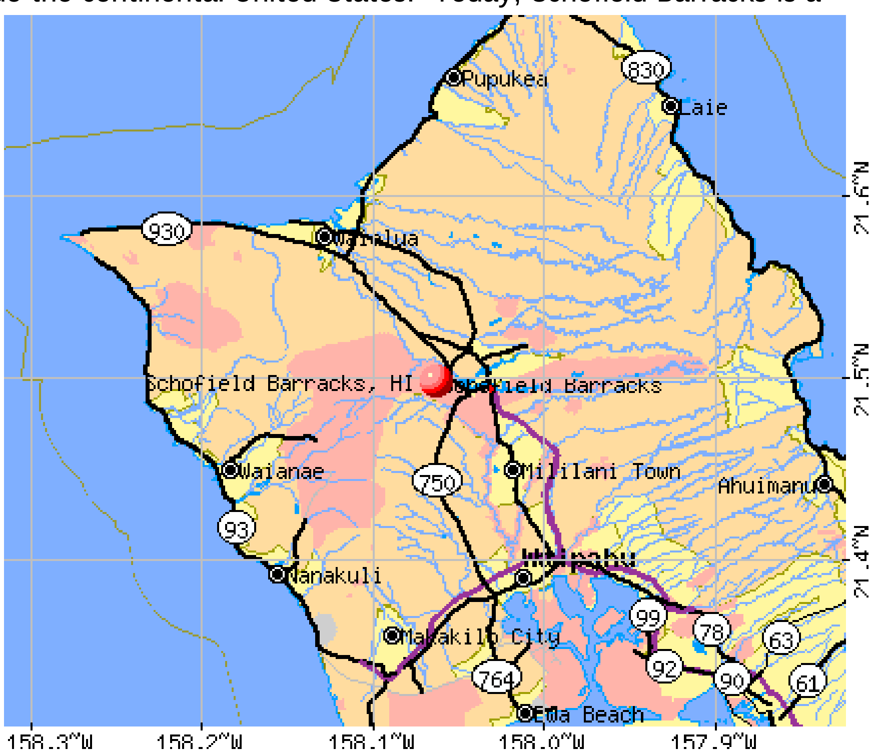



Figure 1

## 8.0 Fuel Cell Site Information and Fuel Supply

The photo at right, Figure 2, shows the front elevation of the Schofield Barracks fire station. This site became the consensus favorite after LOGAN and Schofield representatives toured the base. The fire chief expressed great enthusiasm in hosting the project, and the site, itself, provides a good opportunity to install and display the fuel cell to good effect.

Figure 2

Figure 3

Figure 3 at left shows the fuel cell sitting on its pad at the rear of the fire station. Since natural gas is not available in Hawaii, LOGAN has selected an LPGas unit for this project. The 250-gallon LPGas fuel tank, pictured immediately below in Figure 4 provides fuel storage for the project and sits approximately 25 feet away from the fuel cell.


Figure 4

While operating at a set point of 2.5kW, the GenSys5P fuel cell will consume .53 gallons of LPGas per hour. This equates to 20% electrical efficiency, which is low by conventional power generation standards. However, this is a first generation LPGas fuel cell, and the more important issue will be to determine that the product functions in accordance with its design specifications and achieves 90% availability during the test period. When thermal recovery is added to the efficiency equation, then overall efficiency could exceed 55% under ideal circumstances.

LOGAN processed a digging permit prior to beginning site work. No other permits were required at this site.


Figure 5
May 13, 2005 Photo of Acceptance Test Attendees

## 9.0 Electrical System

The Plug Power GenSys5P PEM fuel cell power plant provides both gird parallel and grid independent operating configurations. This dual capability is an important milestone in the development of the GenSys5 product, and for the PEM Program itself, as it is a significant developmental step on the pathway to product commercialization. The unit has a power output of 110/120 VAC at 60 Hz, and when necessary the voltage can be adjusted to 208vac or 220vac depending upon actual site conditions. The photo above right, Figure 6, shows the electrical service panel in at the rear entrance to the fire station.

Figure 6

Figure 7

This is the point of electric service entry to the facility. The fuel cell grid parallel conductor has been wired to this panel at a spare 60-amp circuit breaker and provides up to 45 amps electricall service to facility loads. In addition, LOGAN installed a new fuel cell emergency panel, pictured above left in Figure 7, inside the fire station office, in order to provide up to 35 amps of stand-by power to computer server, communications, and emergency lighting loads within the facility. Note the station UPS wired into the emergency panel (white box seen in Figure 7). In the event of a utility grid failure during the test period, the fuel cell will provide power to these circuits until the utility restores power service to the base.

## 10.0 Thermal Recovery System

While operating at a power set point of 2.5kW, the GenSys5P circulates 8,000Btu/H of 140 degree F hot water through a customer heat exchanger. If the is no demand for heat, the unit rejects process heat through an air-cooled radiator. In order to capture this thermal energy and provide it to the fire station, LOGAN installed a Heliodyne heat exchanger to transfer fuel cell process heat to the existing hot water heater, pictured in Figure 8 in the photo below.

The Heliodyne is a “U” shaped coil within a coil design that provides double wall protection between the heat source and the heat sink. It was designed primarily for the solar heating industry, but has proved to be very adaptable to the fuel cell industry as well. The Heliodyne, seen installed on the fire station water heater at has its own pump that circulates the tank in a counter flow against incoming hot water provided by the fuel cell’s heat exchanger. While this method of waste heat recovery, typically, has a low load factor, the demonstration provides an opportunity to evaluate the effectiveness of the heat transfer system and refine installation methods.

Figure 8

11.0 Data Acquisition System

In order to monitor the fuel cell and capture/trend performance data, LOGAN installed a Connected Energy Corporation (CE) web based SCADA system that connects to a local ISP. The schematic drawing seen below in Figure 9 describes the architecture of the Terminal Unit hardware that supports the project. The system provides a comprehensive data acquisition solution and also incorporates remote control, alarming, notification, and reporting functions. The system captures and displays a number of fuel cell operating parameters on functional screens including kWh, cell stack voltage, and water management, as well as external instrumentation inputs including Btu transfer, fuel flow, and thermal loop temperatures.

With the installation of this system at the Schofield Barracks project, LOGAN continues to learn new lessons in Web based CHP resource management. The web communications interface at the fire station is provided by a local ISP.

The CE system requires very precise signals from the outputs of these devices. The gas meters, watt meters, flow meters and thermal elements invariably require signal strength adjustment at the RTU terminals to insure that their discrete inputs are readable by the system. Discovering the proper voltage range required for each signal loop is most often achieved by trial and error, requiring multiple site visits to establish a readable connection. In other instances LOGAN has discovered that flow metering devises and thermal couples often require high levels of maintenance and/or replacement to support continuous data collection. It is anticipated that the humid oceanic climatic conditions in Hawaii will expose a new set of functional issues that will provide new learning experiences

Already this appears to be occurring. For some as yet undiagnosed reason the site RTU has proven unable to retrieve a constant stream of data. Instead, LOGAN has been able to retrieve only intermittent data after three months of operation. Unfortunately, after exhaustive troubleshooting of the system and changing many components, the solution has not yet become apparent. In order to correct t his deficiency, LOGAN has launched a comprehensive installation process/materials/ practices review in an all out effort to correct the problem. We believe that is will be solved in short order.

Connected Energy's Operations Control Center in Rochester, New York, collects, stores, displays, alarms, archives site data, and maintains connectivity by means of a Virtual Private Network link to the fuel cell.

Figure 10, on page 14, is an example of one of many data screens that are maintained by the CEC system and displayed on the web. Due to the problem described above the screen provides only incomplete data in the data display boxes. A sample data graph is also attached to Appendix 2 providing kWh and fuel flow from May 5 to the present.

To view the operation of this unit online, please open your browser to:
https://www.enerview.com/EnerView/login.asp
Then login as: Logan. user and enter password: guest. Select within the Pacific Region the location labeled Schofield Barracks then you may navigate the site or other LOGAN sites using the tool bars or html keys.

CEC WEB enabled SCADA terminal hardware.

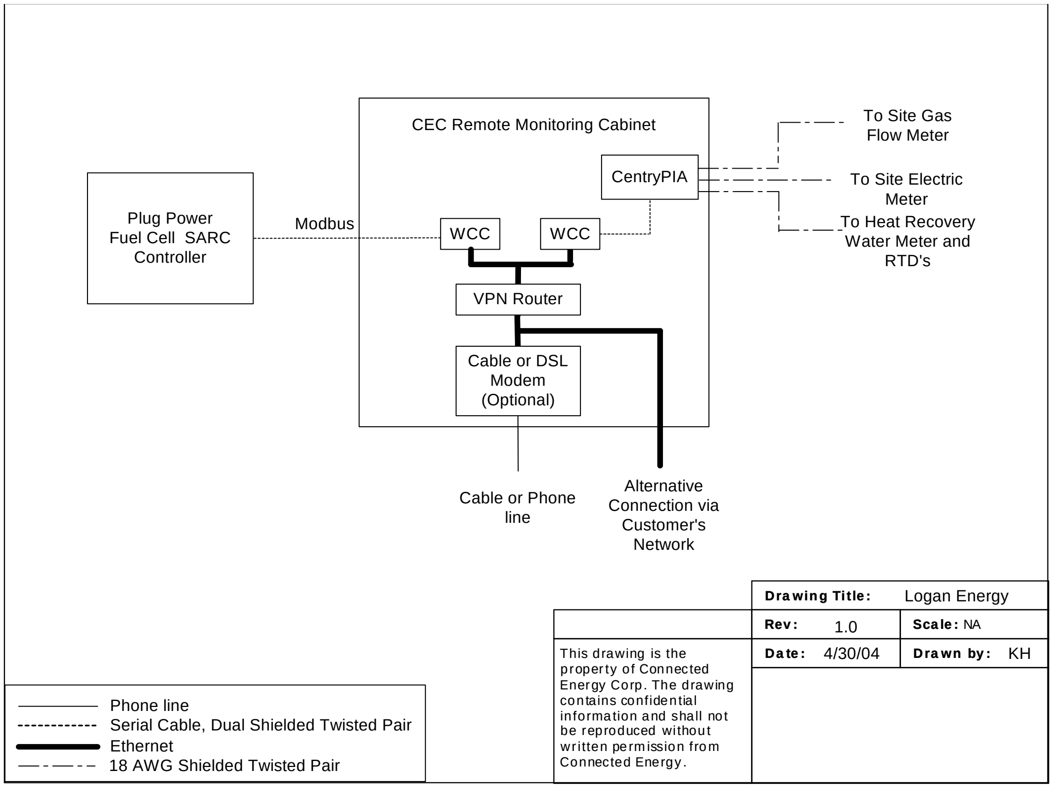



Figure 9

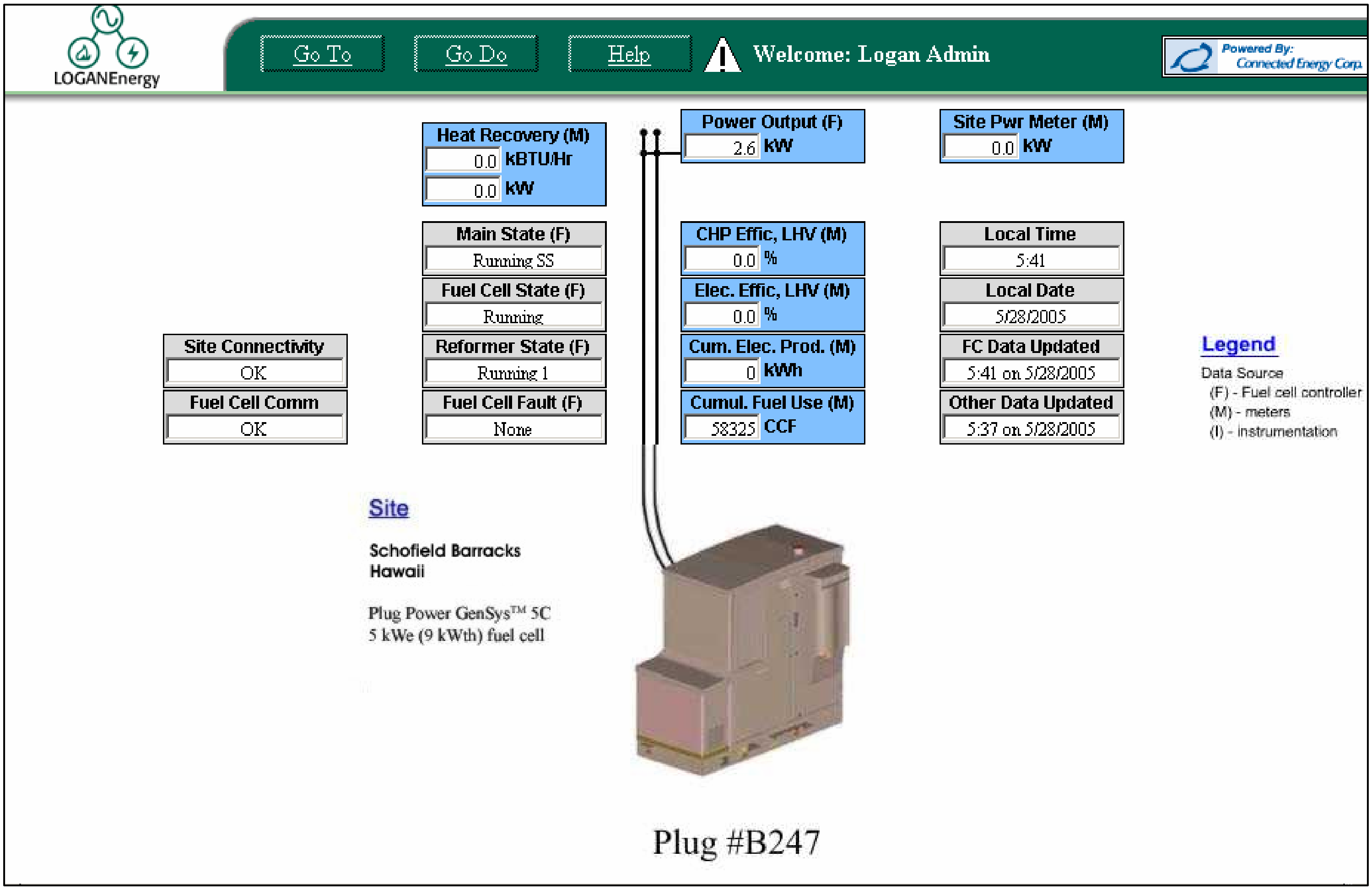



Figure 10
Schofield Barracks Data Screen indicating operating status…note that some data boxes are not recording due to the service issues described above.

## 12.0 Economic Analysis

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **US Army Scofield Barracks, Honolulu, HI** | | | | | | | |
| 1) Water (per 1,000 gallons) | | $ | 0.85 | | | | |
| 2) Utility (per KWH) | | $ | 0.130 | | | | |
| 3) LPGas ( per gallon) | | $ | 1.00 | | | | |
| **First Cost** | | | | **Estimated** | | **Actual** | |
| Plug Power 5 kW SU-1 | | | | $ | 75,000 | $ | 75,000 |
| Shipping | | | | $ | 4,800 | $ | 1,750 |
| Installation electrical | | | | $ | 4,875 | $ | 5,351 |
| Installation mechanical, LPGas & thermal | | | | $ | 13,205 | $ | 8,946 |
| Web Package | | | | $ | 5,200 | $ | 8,770 |
| Site Prep, labor materials | | | | $ | 375 | $ | 941 |
| Training | | | | $ | 2,000 | | |
| Lodging and Perdiem | | | | | | $ | 2,461 |
| Technical Supervision/Start-up | | | | $ | 3,000 | $ | 4,500 |
| Total | | | | **$** | **108,455** | **$** | **107,719** |
| **Assume Five Year Simple Payback** | | | | $ | 21,691 | $ | 21,544 |
| **Forcast Operating Expenses** | Vol/hr | | $/Hr | | $/ Yr | | |
| LPGas gallons | 0.5300 | $ | 0.53 | $ | 4,178.52 | | |
| Water Gallons per Year | 14,016 | | | $ | 11.91 | | |
| Total Annual Operating Cost | | | | | | $ | 4,190.43 |
| **Economic Summary** | | | | | | | |
| Forcast Annual kWH | | | 19710 | | | | |
| Annual Cost of Operating Power Plant | | $ | 0.213 | kWH | | | |
| Credit Annual Thermal Recovery Rate | | | ($0.0297) | kWH | | | |
| Project Net Operating Cost | | $ | 0.183 | kWH | | | |
| Displaced Utility cost | | $ | 0.130 | kWH | | | |
| **Energy Savings (Cost)** | | | ($0.053) | kWH | | | |
| **Annual Energy Savings (Cost)** | | | ($1,042.72) | | | | |

**Explanation of Calculations:**

**Actual First Cost Total** is a *sum* of all the listed first cost installation tasks and components.
**Assumed Five Year Simple Payback** is the Estimated First Cost Total *divided by* 5 years.

**Forecast Operating Expenses:**

LPGas usage in a fuel cell system set at 2.5 kW will consume 0.53 gallons LPGas per hour. The cost per hour is 0.53 gallons per hour *x* the cost of LPGas to the site. The LPGas cost at this site is $1.00/ gallon.

GenSys fuel cell systems set at 2.5 kW will consume 1.6 gallons of water per hour through the DI panel. The estimated volume of water consumed at 14,016 gallons per year is 1.6 gph *x* 8760 hours per year. The cost per year at $170.01 is 14,016 gph *x* cost of water to the site at $12.13 per 1000 gallons.

The Total Annual Operating Cost, $4,190 is the *sum of* the cost per year for fuel and the cost per year for the water consumption.

**Economic Summary:**

The Forecast Annual kWh at 19,710 kWh is the product of 2.5 kW set-point for the fuel cell system *x* 8760 hours per year *x* 0.9. The 0.9 is for 90% estimated availability.
The Annual Cost of Operating the Power Plant at $0.213 per kWH is the Total Annual Operating Cost of $4,190 *divided by* the forecast annual kWh of 19,710 kWh.
The Credit Annual Thermal Recovery at -$0.029/kWh is 7800 *divided by* 3414. This is then *multiplied by* 0.9 *x* 0.1 *x* the cost of electricity at $0.1300 per kWh *x* (-1). As a credit to the cost summary, the value is expressed as a negative number.
The Project Net Operating Cost is the *sum* of the Annual Cost of Operating the Power Plant *plus* the Credit Annual Thermal Recovery. In this case the fuel cell operating cost of $0.183/kWh is $0.053/kWh more per kWh than the competitive grid rate of $0.13/kWh. As a result the project projects a net energy cost increase to the base of $1,042.
The Displaced Utility Cost is the cost of electricity to Kaneohe Bay per kWh.

**Energy Savings (cost)** equals the Displaced Utility Cost *minus* the Project Net Operating Cost.

**Annual Energy Savings (cost)** equals the Energy Savings (cost) *x* the Forecast Annual kWh.

Appendix

1) Monthly Performance Data

2) Performance Data Graph

3) Work Log/Incident reports

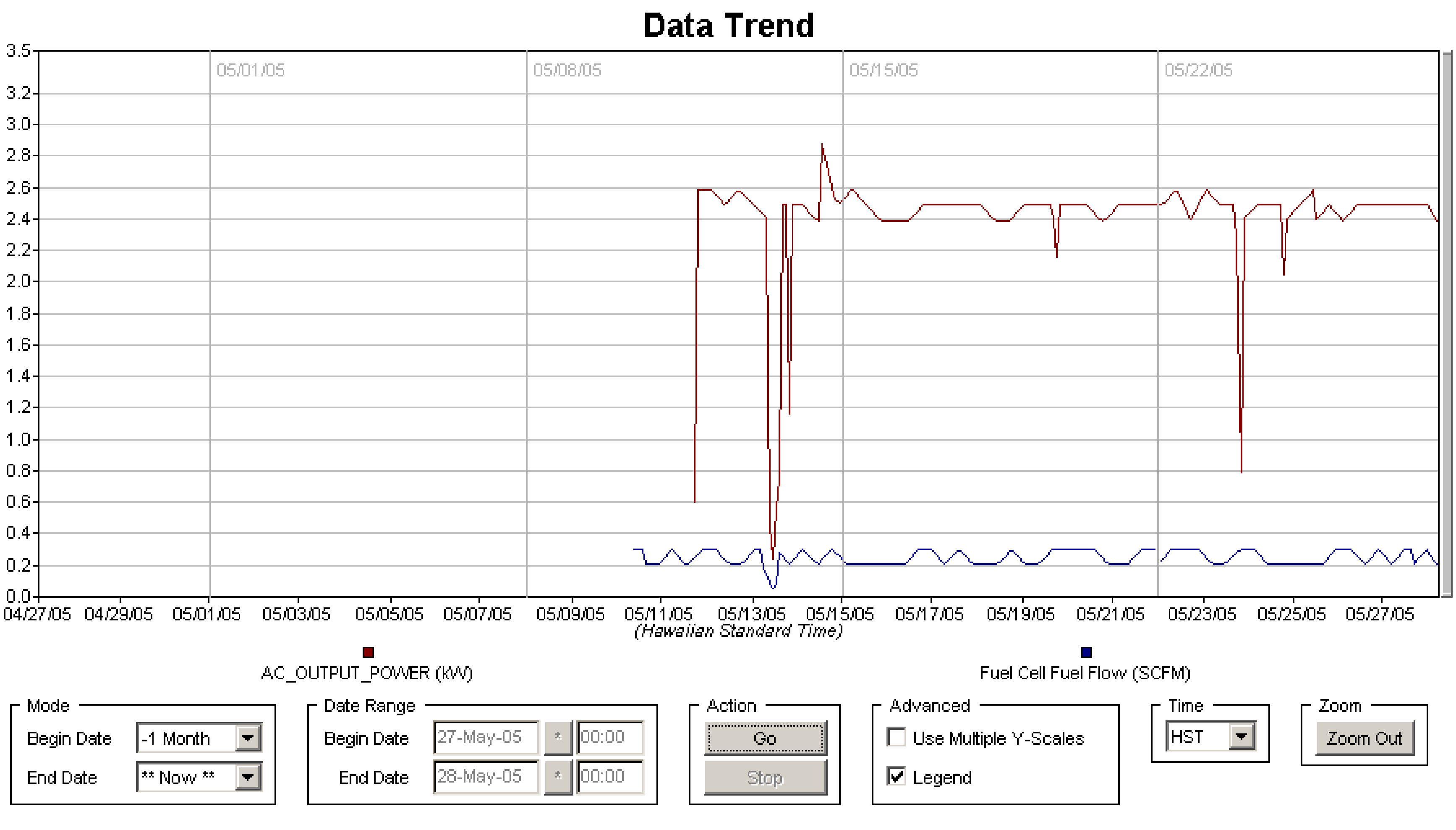
Appendix 1… Monthly Performance Data

## Suggested Format for PEM Fuel Cell Performance Data

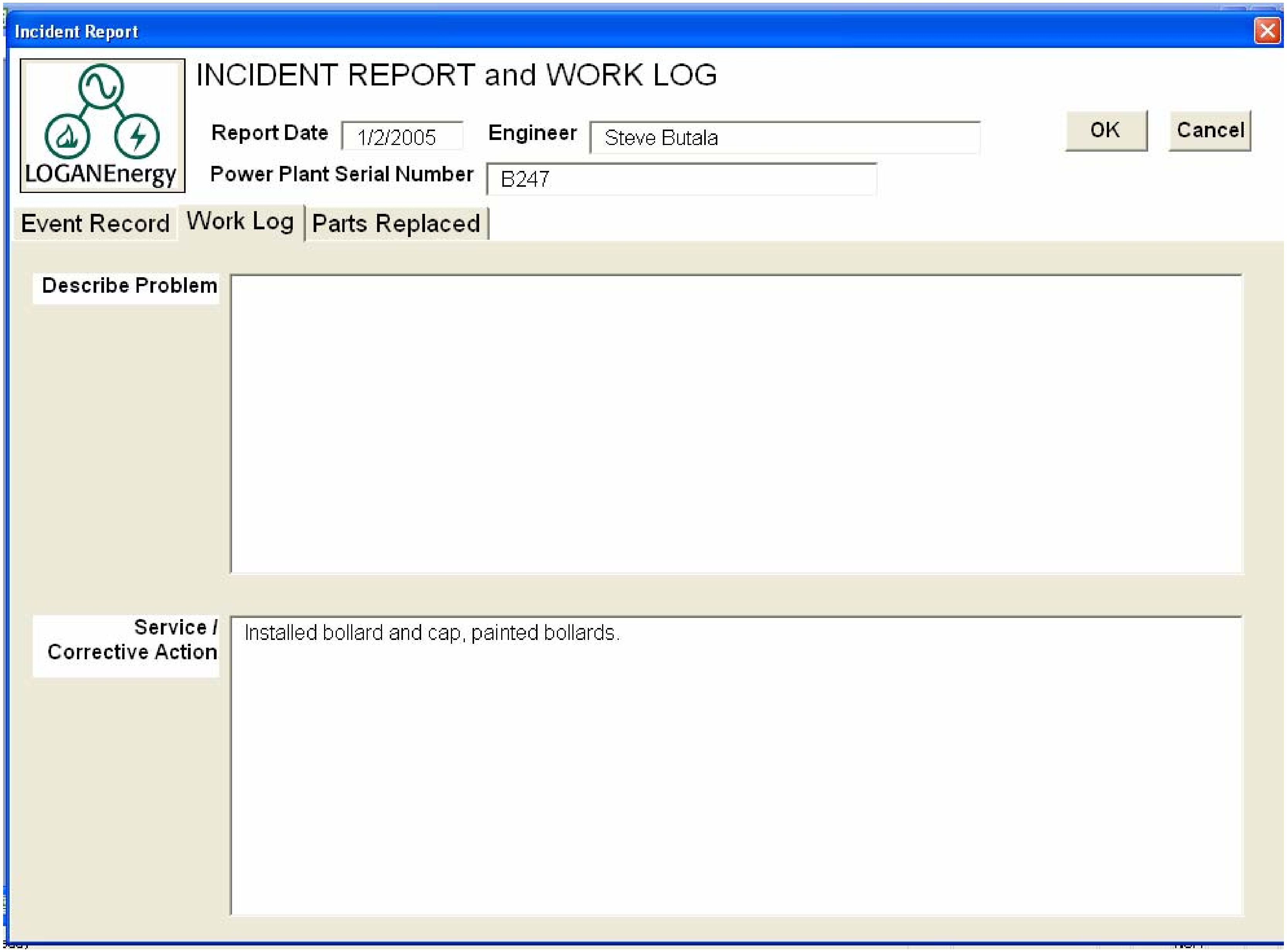
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **System Number:** | **)01B000000247-LI** | **Commission Date:** | **1/1/2005** | | **Site Location(City,State):** | **Oahu, Hawaii** | |
| **Site Name:** | **;chofield Barrack** | **Fuel Cell Type:** | **Plug Power PEM** | | | | |
| **Fuel Type:** | **LPG** | **Contractor:** | **LOGANEnergy Inc.** | | | | |
| **Lower Heating Value:** | **943** BTU/scf | **Local Res Fuel Cost:** | **$2.10** | **$/Gal** | **Base Fuel Cost per Therm:** | **$1.00** | **$/Gal** |
| **Capacity kW** | **5** | **Local Res Electricity::** | **$0.16** | **$/kWhr** | **Base Electricity Cost per kWhr:** | **$0.13** | **$/kWhr** |

| Month | Run Time (Hours) | Time in Period (Hours) | Availability (%) | Energy Produced (kWe-hrs AC) | Output Setting (kW) | Average Output (kW) | Capacity Factor (%) | Fuel Usage, LHV (kWh) | Fuel Usage, LHV (BTUs) | Fuel Usage (SCF) | Electrical Efficiency (%) | Thermal Heat Recovery (BTUs) | Heat Recovery Rate (BTUs/hour) | Thermal Efficiency (%) | Overall Efficiency (%) | Number of Sched Outages |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| insert month | insert operating hours | insert hours in month | *1 | insert produced energy | insert output setting | *2 | *3 | insert fuel consumption | | | *4 | insert heat recovery | *5 | *6 | *7 | insert value |
| 1/5 | 720 | 720 | 100% | 1765.3 | 2.5 | 2.451805556 | 0.490361111 | 6861 | 23409732 | 23142.86106 | 0.257445673 | 0 | 0 | 0 | 0.257445673 | 0 |
| 2/5 | 672 | 672 | 100% | 1648 | 2.5 | 2.452380952 | 0.49047619 | 6414 | 21884568 | 21635.08392 | 0.257088557 | 0 | 0 | 0 | 0.257088557 | 0 |
| 3/5 | 744 | 744 | 100% | 1833 | 2.5 | 2.463709677 | 0.492741935 | 7370 | 25146440 | 24859.77058 | 0.248856777 | 0 | 0 | 0 | 0.248856777 | 0 |
| 4/5 | 720 | 720 | 100% | 1820 | 2.5 | 2.527777778 | 0.505555556 | 7461 | 25456932 | 25166.72298 | 0.244078116 | 0 | 0 | 0 | 0.244078116 | 0 |

Appendix 2... Graph of kW power generation plotted against fuel flow to the system.



.Appendix 3... Work Logs and Incident Reports


Incident Report

INCIDENT REPORT and WORK LOG

LOGANEnergy

Report Date: 1/2/2005

Engineer: Steve Butala

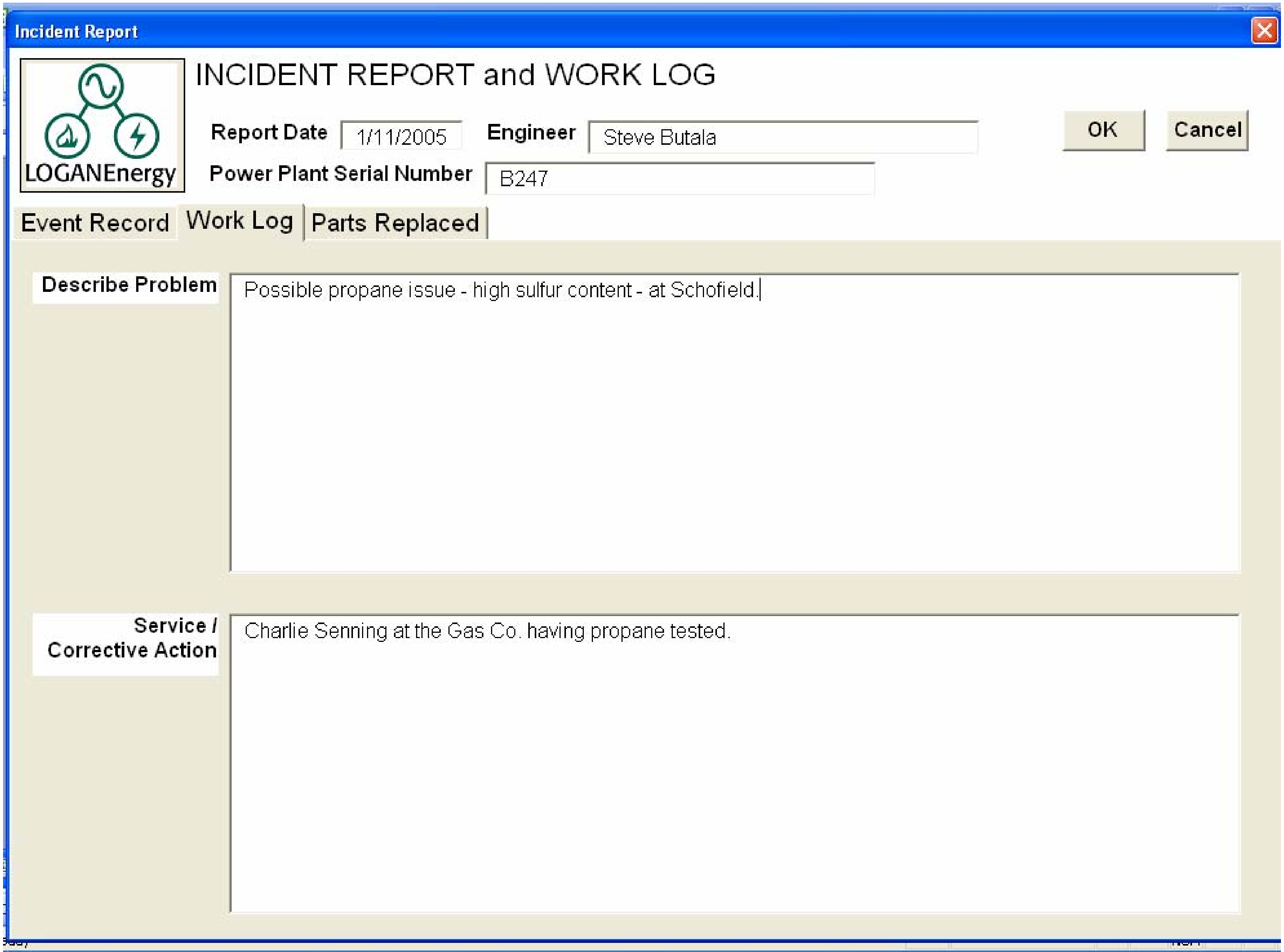
Power Plant Serial Number: B247

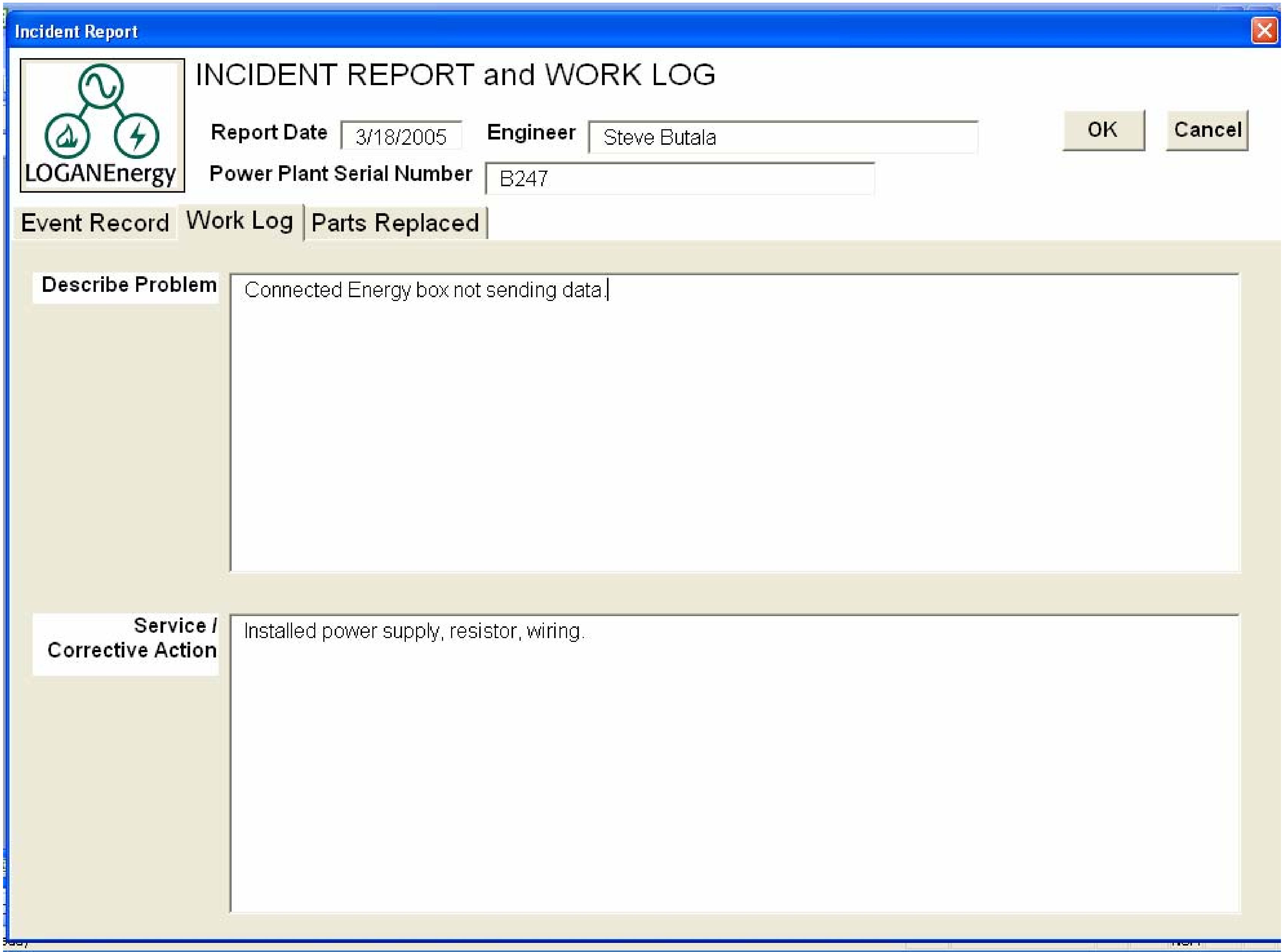
OK | Cancel

Event Record | Work Log | Parts Replaced

Describe Problem:

Service / Corrective Action: Installed bollard and cap, painted bollards.


Incident Report
INCIDENT REPORT and WORK LOG
LOGANEnergy
Report Date
1/11/2005
Engineer
Steve Butala
OK
Cancel
Power Plant Serial Number
B247
Event Record
Work Log
Parts Replaced
Describe Problem
Possible propane issue - high sulfur content - at Schofield.
Service / Corrective Action
Charlie Senning at the Gas Co. having propane tested.


Incident Report

INCIDENT REPORT and WORK LOG

LOGANEnergy

Report Date 3/18/2005 Engineer Steve Butala

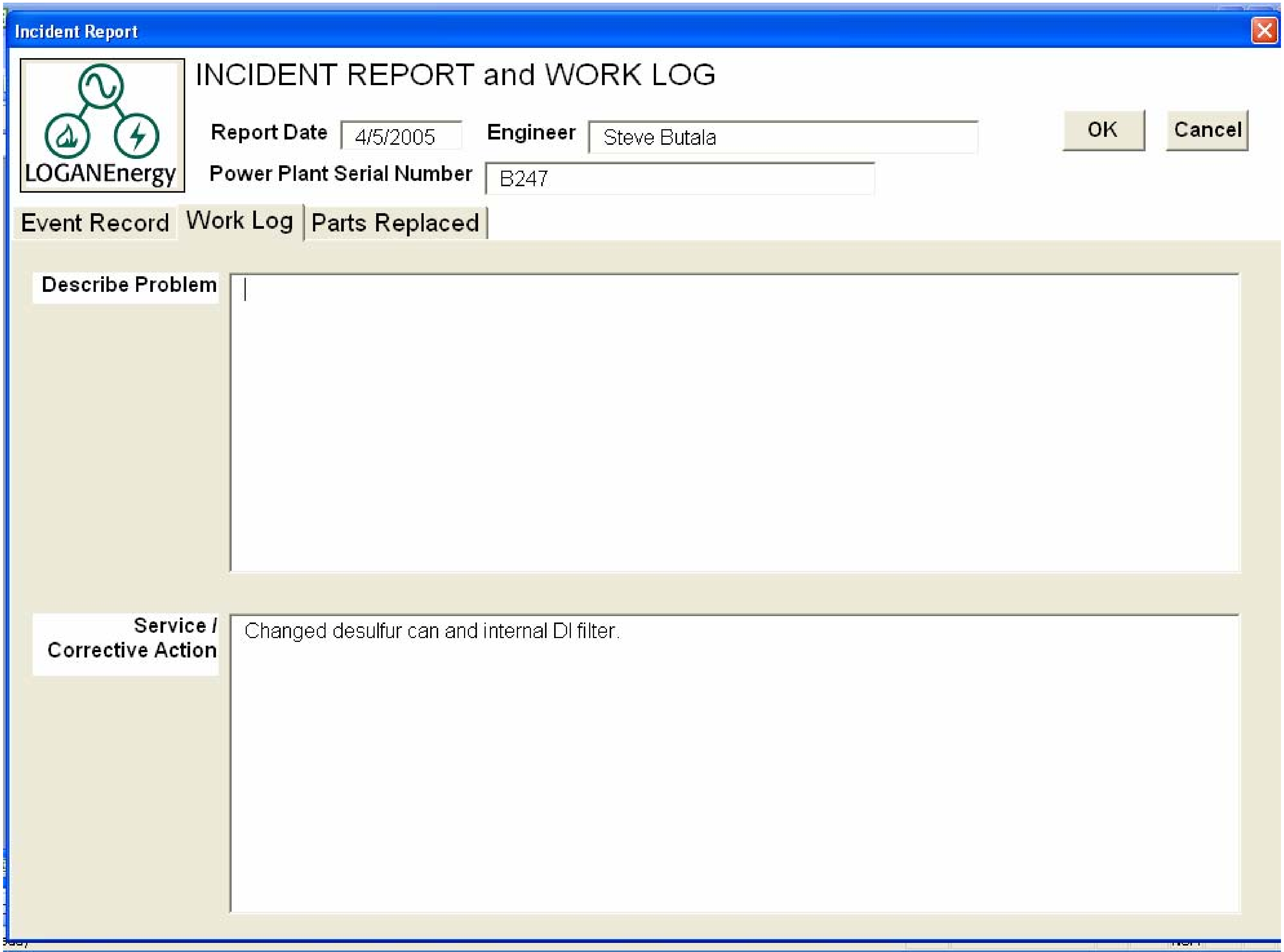
Power Plant Serial Number B247

OK Cancel

Event Record | Work Log | Parts Replaced

Describe Problem: Connected Energy box not sending data.

Service / Corrective Action: Installed power supply, resistor, wiring.



Incident Report

LOGANEnergy

INCIDENT REPORT and WORK LOG

Report Date 4/5/2005 Engineer Steve Butala

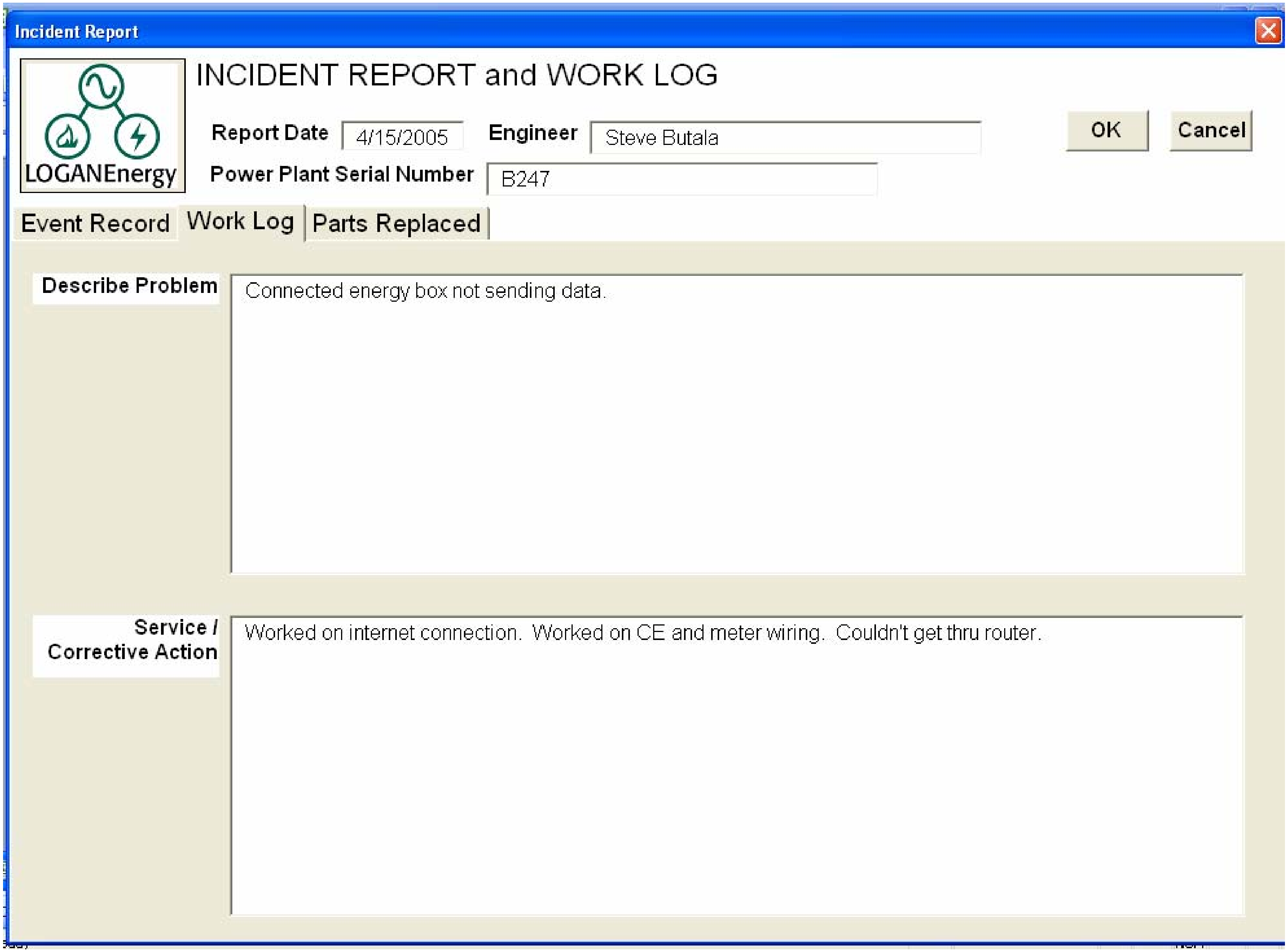
Power Plant Serial Number B247

OK Cancel

Event Record | Work Log | Parts Replaced

Describe Problem

Service / Corrective Action: Changed desulfur can and internal DI filter.



Incident Report

INCIDENT REPORT and WORK LOG

LOGANEnergy

Report Date: 4/15/2005

Engineer: Steve Butala

Power Plant Serial Number: B247

OK | Cancel

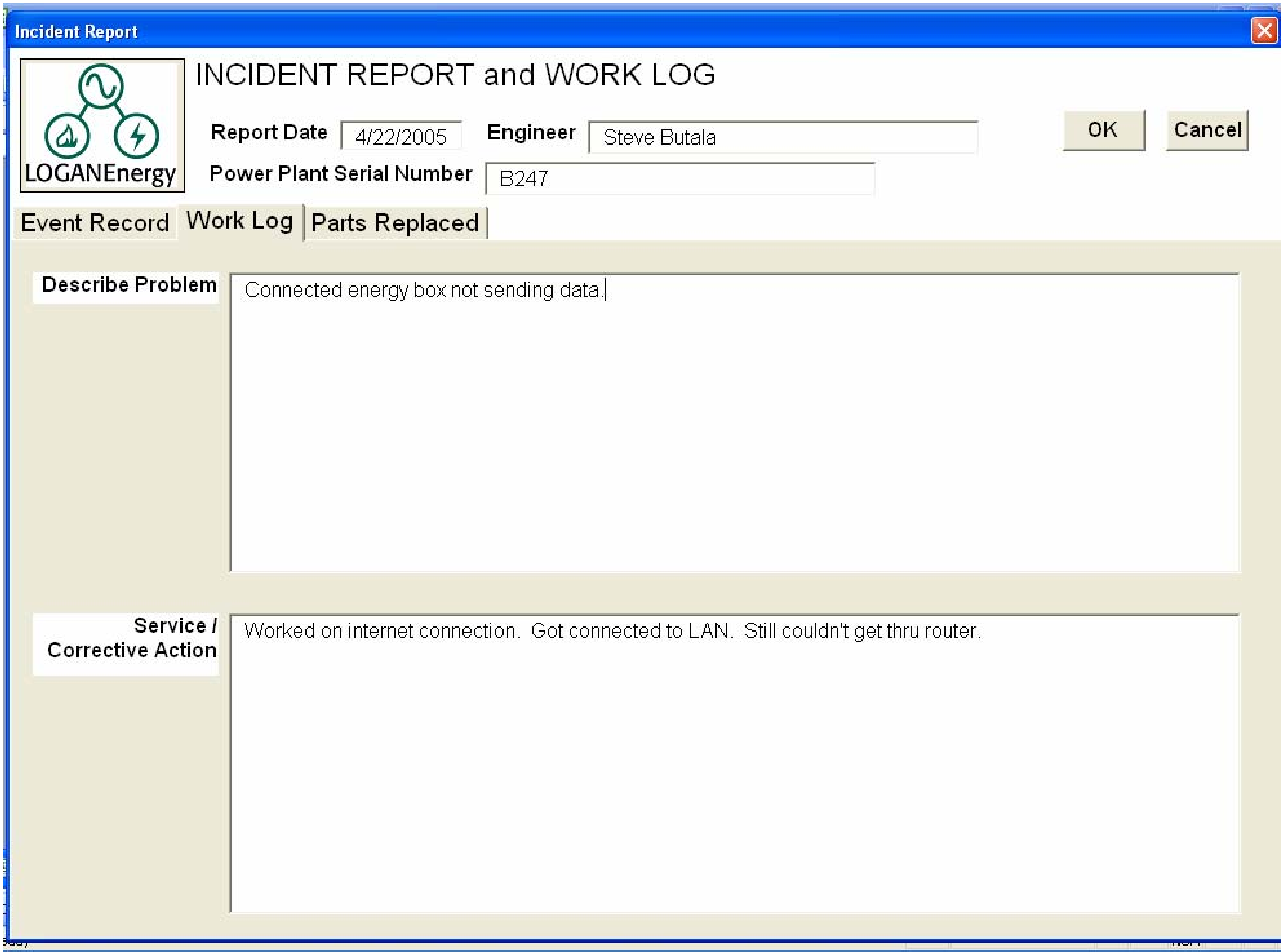
Event Record | Work Log | Parts Replaced

**Describe Problem**

Connected energy box not sending data.

**Service / Corrective Action**

Worked on internet connection. Worked on CE and meter wiring. Couldn't get thru router.


Incident Report
INCIDENT REPORT and WORK LOG
LOGANEnergy
Report Date
4/22/2005
Engineer
Steve Butala
OK
Cancel
Power Plant Serial Number
B247
Event Record
Work Log
Parts Replaced
Describe Problem
Connected energy box not sending data.
Service / Corrective Action
Worked on internet connection.  Got connected to LAN.  Still couldn't get thru router.

Incident Report

# INCIDENT REPORT and WORK LOG

LOGANEnergy

**Report Date** 5/7/2005 **Engineer** Steve Butala

**Power Plant Serial Number** B247

OK Cancel

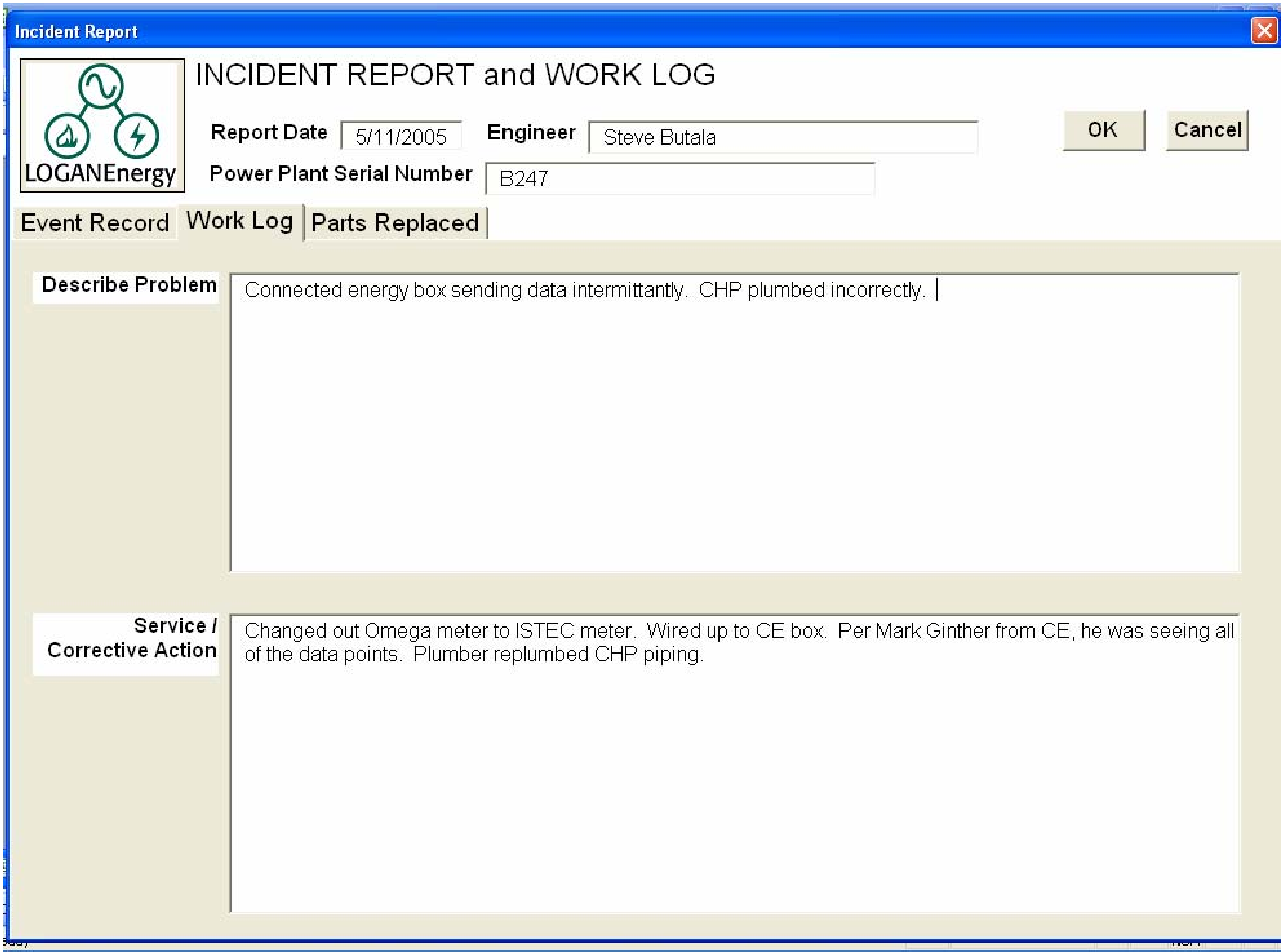
Event Record | Work Log | Parts Replaced

**Describe Problem**

Connected energy box not sending data.

**Service / Corrective Action**

Finally got thru router. Data sending and receiving but intermittantly.



Incident Report

INCIDENT REPORT and WORK LOG

Report Date: 5/11/2005

Engineer: Steve Butala

Power Plant Serial Number: B247

OK | Cancel

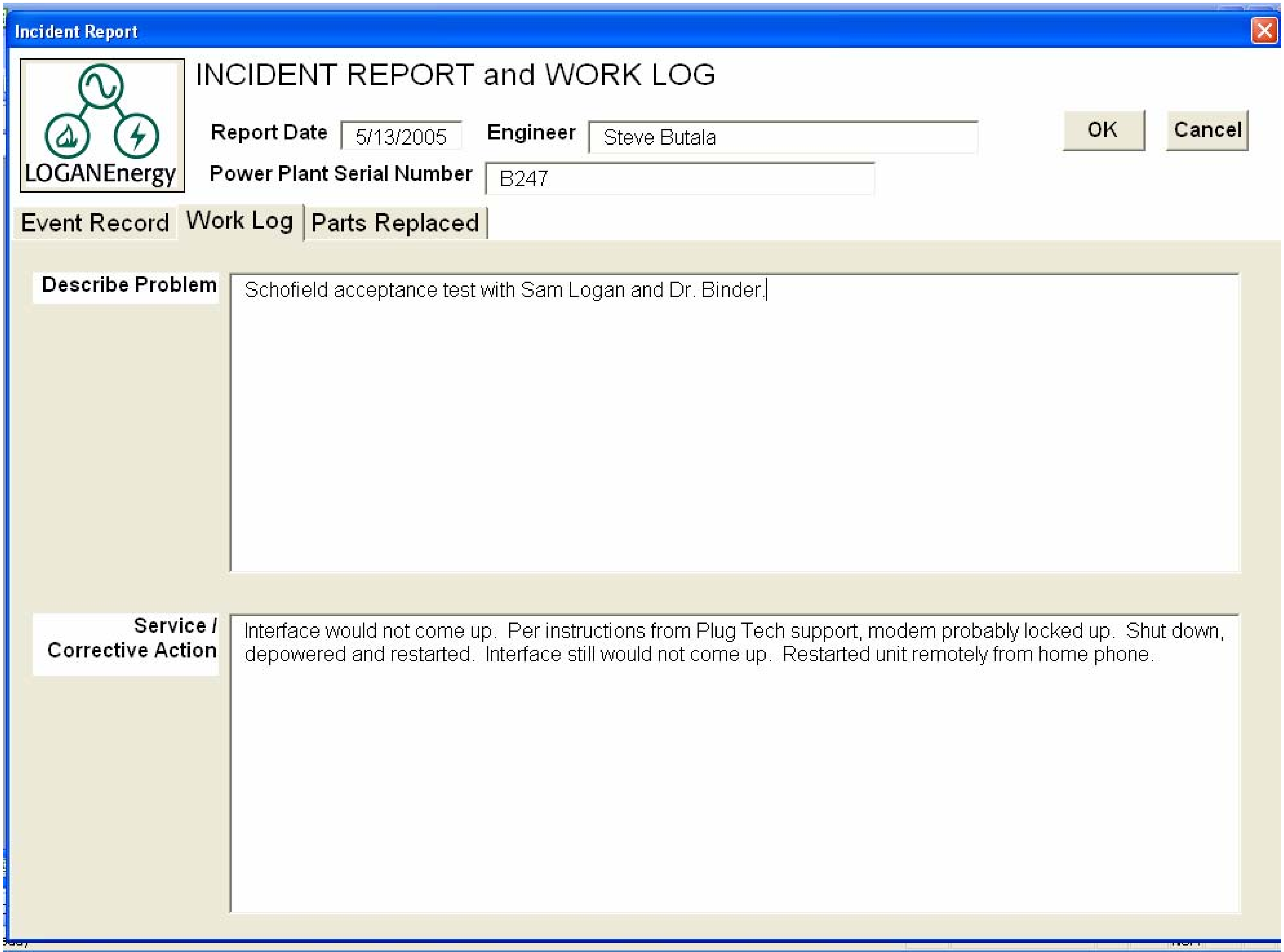
Event Record | Work Log | Parts Replaced

**Describe Problem**

Connected energy box sending data intermittantly. CHP plumbed incorrectly.

**Service / Corrective Action**

Changed out Omega meter to ISTEC meter. Wired up to CE box. Per Mark Ginther from CE, he was seeing all of the data points. Plumber replumbed CHP piping.



Incident Report

INCIDENT REPORT and WORK LOG

LOGANEnergy

Report Date: 5/13/2005

Engineer: Steve Butala

OK | Cancel

Power Plant Serial Number: B247

Event Record | Work Log | Parts Replaced

**Describe Problem**

Schofield acceptance test with Sam Logan and Dr. Binder.

**Service / Corrective Action**

Interface would not come up. Per instructions from Plug Tech support, modem probably locked up. Shut down, depowered and restarted. Interface still would not come up. Restarted unit remotely from home phone.